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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 7590 05/23/2005 Brinks Hofer Gilson & Lione P.O. Box 10395 Chicago, IL 60610 | | | EXAMINER NGUYEN, HOANG V | |
| | | | ART UNIT 2821 | PAPER NUMBER |

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/812,334

Applicant(s)

YUANZHU, DOU

Examiner

Hoang V. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 20-28 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-10, 12-16, 18 and 29-40 is/are rejected.
- 7) ☒ Claim(s) 4, 11 and 17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/29/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Claim Objections

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 20-41 have been renumbered 19-40.

Examiner's Amendment

2. In the claims:

Claim 20, delete [20] and insert --19--.

Claim 21, delete [21] and insert --20--.

Claim 22, delete [21] and insert --20--.

Claim 23, delete [20] and insert --19--.

Claim 24, delete [24] and insert --23--.

Claim 25, delete [20] and insert --19--.

Claim 26, delete [20] and insert --19--.

Claim 27, delete [20] and insert --19--.

Claim 28, delete [20] and insert --19--.

Claim 30, delete [30] and insert --29--.

Claim 31, delete [30] and insert --29--.

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Claim 32, delete [30] and insert --29--.

Claim 33, delete [33] and insert --32--.

Claim 34, delete [33] and insert --32--.

Claim 35, delete [33] and insert --32--.

Claim 36, delete [33] and insert --32--.

Claim 37, delete [34] and insert --33--.

Claim 38, delete [34] and insert --33--.

Claim 39, delete [30] and insert --29--.

Claim 40, delete [40] and insert --39--.

The examiner's amendment was done as a result of the renumbering of claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 29-33 and 35-40 are rejected under 35 U.S.C. 102(e) as being anticipated by Taira et al (US 6,731,243 B2).

Regarding claim 1, Taira (Figures 3 and 4) discloses a patch antenna apparatus comprising a ground plane 31; a dielectric substrate 32 disposed on the ground plane; a patch

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electrode 33 provided on a surface of the dielectric substrate opposing the ground plane; current feed means 34 connected to the patch electrode; and a metal frame 35 surrounding a peripheral surface of the dielectric substrate.

Regarding claim 2, as applied to claim 1, Figure 3 of Taira shows that a height dimension of the metal frame 35 is larger than a thickness dimension of the dielectric substrate 32.

Regarding claim 29, Taira (Figures 3 and 4) discloses a patch antenna apparatus comprising a ground plane 31; a dielectric substrate 32 disposed on the ground plane; a patch electrode 33 provided on a surface of the dielectric substrate opposing the ground plane and connected to current-feed means 34; and redirection means 35 for redirecting a direction of radiation from the patch antenna such that a direction in which the radiation is maximized is oblique to a direction perpendicular to the surface of the dielectric substrate.

Regarding claim 30, as applied to claim 29, Taira teaches that the redirection means redirects the radiation such that the maximum radiation direction is at an elevation angle of about 30 degrees from a plane perpendicular to the surface of the dielectric substrate.

Regarding claim 31, as applied to claim 29, Taira teaches that the redirection means redirects the maximum radiation away from the perpendicular direction.

Regarding claim 32, as applied to claim 29, Figure 4 of Taira shows that the redirection means is laterally separated from and disposed at discrete intervals around the patch electrode.

Regarding claim 33, as applied to claim 32, Figure 4 of Taira shows that the redirection means is laterally separated from the dielectric substrate.

Regarding claim 35, as applied to claim 32, Figure 4 of Taira shows that the redirection means extends over the dielectric substrate.

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Regarding claim 36, as applied to claim 32, Figure 4 of Taira shows that the redirection means extends over the patch electrode.

Regarding claim 37, as applied to claim 33, Figure 4 of Taira shows that the redirection means extends over the dielectric substrate.

Regarding claim 38, as applied to claim 33, Figure 4 of Taira shows that the redirection means extends over the patch electrode.

Regarding claim 39, as applied to claim 29, Figure 4 of Taira shows that the redirection means is laterally separated from and disposed continuously around the patch electrode.

Regarding claim 40, as applied to claim 39, Figure 4 of Taira shows that an end of the redirection means is more distal from the ground plane than the patch electrode.

5. Claims 8, 10, 12-15 and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Van Hoozen (US 6,181,279).

Regarding claim 8, Van Hoozen (Figure 1) discloses a patch antenna apparatus comprising a ground plane 16; a dielectric substrate 20 disposed above the ground plane; a patch electrode 12 provide on a surface of the dielectric substrate opposing the ground plane; current feed means 46 and 48 connected to the patch electrode; and at least three bar-shaped conductors 22, each extending in a thickness direction of the dielectric substrate, arranged in the dielectric substrate along a circumference direction of the dielectric substrate, the bar-shaped conductors disposed outside the patch electrode, and lower ends of the bar-shaped conductors connected to the ground plane.

Regarding claim 10, as applied to claim 8, Figure 1 of Van Hoozen shows that the through-holes 22 provided in the dielectric substrate serve as the bar-shaped conductors.

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Regarding claim 12, as applied to claim 8, Van Hoozen (Figure 1 and col 4 lines 60-61) teaches that the current-feed means 46 and 48 connected to the patch electrode 12 to permit the patch antenna to receive circularly polarized waves.

Regarding claim 13, as applied to claim 8, Figure 1 of Van Hoozen shows that an area of the dielectric substrate 20 is larger than an area of the patch electrode 12.

Regarding claim 14, as applied to claim 8, Figure 1 of Van Hoozen shows that the conductors 12 are disposed at regular intervals along the circumference direction.

Regarding claim 15, as applied to claim 8, Figure 2 of Van Hoozen shows that a plan-view shape of the dielectric substrate is substantially similar to a plan-view shape of the patch electrode.

Regarding claim 18, as applied to claim 8, Figure 4 of Van Hoozen shows that the bar-shaped conductors 22 terminate at the surface of the dielectric substrate opposing the ground plane.

6. Claims 29, 32 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Shibata (US 6,801,167 B2).

Regarding claim 29, Shibata (Figures 2 and 3) discloses a patch antenna apparatus comprising a ground plane 6; a dielectric substrate 1 disposed on the ground plane; a patch electrode 5 provided on a surface of the dielectric substrate opposing the ground plane and connected to current-feed means 7; and redirection means 9 for redirecting a direction of radiation from the patch antenna such that a direction in which the radiation is maximized is oblique to a direction perpendicular to the surface of the dielectric substrate.

Regarding claim 32, as applied to claim 29, Figure 2 of Shibata shows that the redirection means 9 is laterally separated from and disposed at discrete intervals around patch electrode 5.

Regarding claim 34, as applied to claim 32, Figure 3 of Shibata shows that the redirection means is laterally separated from the dielectric substrate.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taira et al.

Regarding claim 3, Taira discloses the claimed invention except that a plan-view shape of the metal frame is substantially similar to a plan-view shape of an outer shape of the dielectric substrate. It would have been an obvious matter of design choice to select the plan-view shape of the metal frame to be substantially similar to a plan-view shape of an outer shape of the dielectric substrate such that optimized redirection of the radiation from the patch can be achieved.

Regarding claim 6, Taira discloses the claimed invention except a distance between the dielectric substrate and the metal frame is substantially uniform. It would have been an obvious matter of design choice to select the distance between the dielectric substrate and the metal frame is substantially uniform such that optimized redirection of the radiation from the patch can be achieved.

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9. Claims 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Van Hoozen.

Regarding claim 9, Van Hoozen discloses the claimed invention except that the metal pins are provided as the bar-shaped conductors. It would have been obvious to one having ordinary skill in the art at the time the invention was made to select the metal pins as bar-shaped conductors instead of the conductive through-holes since both are considered to be known equivalents in the antenna art and the selection of any of these known equivalents to serve as bar-shaped conductors provided in the dielectric substrate would be within the level of ordinary skill in the art.

Regarding claim 16, Van Hoozen discloses the claimed invention except that the plan-view shapes of the dielectric substrate and the patch electrode are circular. It would have been an obvious matter of design choice to select the shape of the dielectric substrate and the patch to be circular instead of square-shaped, since such modification would have been involved a mere change in the shape of the component. A change in shape in order to achieve desired radiation characteristics is generally recognized as being within the level of ordinary skill in the art.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taira et al in view of Van Hoozen (US 6,181,279).

Taira discloses the claimed invention except that the current-feed means to permit the patch antenna to receive circularly-polarized waves. Van Hoozen (Figure 1) discloses a patch antenna having circularly polarization feed configuration. It would have been obvious to one of ordinary skill in the art to employ the Taira antenna with Van Hoozen's feed configuration so that the Taira antenna can transmit/receive in circularly polarization.

Allowable Subject Matter

11. Claims 4, 11 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Claims 19-28 are allowed.

13. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 4, Taira fails to further teach, among other features, a ground electrode disposed between the ground plane and the dielectric substrate.

Regarding claim 11, Van Hoozen fails to further teach, among other features, a ground electrode disposed between the ground plane and the dielectric substrate.

Claim 17 would have been found allowable for depending on claim 11.

Regarding claim 19, Taira et al discloses a patch antenna apparatus comprising a ground plane; a dielectric substrate disposed above the ground plane; a patch electrode provide on a top surface of the dielectric substrate opposing the ground plane; and current feed means connected to the patch electrode. Taira, however, fails to further teach at least three metal pins, each having an upright portion extending in a thickness direction of the dielectric substrate, arranged at substantially regular intervals around the dielectric substrate, a lower end of each metal pin connected to the ground plane and an upper end of the upright portion of each metal pin continues to a lateral metal member that is arranged above the dielectric substrate.

Claims 20-28 are allowed for depending on claim 19.

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Correspondence

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoang V. Nguyen whose telephone number is (571) 272-1825. The examiner can normally be reached on Mondays-Fridays from 9:00 a.m. to 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoang Nguyen can be reached on (571) 272-1825. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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5/18/05



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